

A Method and Apparatus for Detecting Electrical Failures on a Die through Maximizing Passive Voltage Contrast on its Surface

ABSTRACT OF THE INVENTION

A method and apparatus for maximizing passive voltage contrast on the surface of a die and then using the maximized passive voltage contrast to identify electrical failures in the die. The method employs a primary electron beam to scan the surface of the die. In response, secondary electrons are emitted from the die and then captured by a secondary electron detector. The density of secondary electrons is further modulated by a passive voltage near the die surface. To enhance the passive voltage contrast on the die surface, the incident angle of the primary electron beam is adjusted with respect to the die, the passive voltage contrast reaching a maximum at an incident angle of about 75° or above. With such enhanced contrast, an image depicting the magnitude of the secondary electron current can be used to detect electrical failures in the die.